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ABSTRACT

A study undertaken in India on the diffusion of innovations compared 108 villages on factors which affect adoption of agricultural innovations, and then made comparisons of the adoption behavior of 680 Indian farmers. The third phase of the project compared the effectiveness of radio farm forums and adult literacy classes for communicating information. The two villages using radio farm forums showed significantly more progress then either the two villages with literacy classes or the two control villages. There was some tendency for literacy villages to show more progress than control villages, but differences were usually not statistically significant. It was concluded that a well-run radio farm forum should result in rather immediate accelerated development, and that literacy programs should be considered either as a long-term investment in development or as a social welfare measure. (MF)

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COMMUNICATION IN INDIA

Experiments in Introducing Change

AC 008 355

COMMUNICATION IN INDIA

EXPERIMENTS IN INTRODUCING CHANGE

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Research Report 15
Project on the Diffusion of Innovations in Rural Societies

Co-operating Institutions

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Department of Communication, Michigan State University
Ministry of Food, Agriculture, Community Development and Co-operation, Government of India
United States Agency for International Development

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PREFACE

THIS is the third Indian report of the Diffusion of Innovations project which was undertaken in collaboration with Michigan State University. The first report was based on an analysis of 108 villages and was published by the National Institute of Community Development in March, 1968, under the title, *Agricultural Innovations in Indian Villages*. The second report, entitled *Agricultural Innovation Among Indian Farmers* is being published simultaneously with this report by the NICD, and is based on an analysis of 680 Indian farmers and also investigates patterns of diffusion of agricultural innovations.

This third report takes advantage of a previous study, done in collaboration with UNESCO and Michigan State University, to measure the continuing results of communication treatments designed to promote adoption of innovations. The previous study was reported in August, 1967, NICD preliminary report, *The Impact of Communications on Rural Development in India.*

Data for the follow-up survey, undertaken by the Diffusion of Innovations project, were gathered in Lucknow in September and October of 1967. Project directors were F. C. Fliegel, P. Roy, L. K. Sen and J. E. Kivlin. J. M. Kapoor supervised the field team, consisting of P. M. Shingi, B. R. Patil, V. K. Surkar, S. K. Shelar and G. S. Sekhon. Data for this report were processed at the Computer Centre of the Programme Evaluation Organization, Planning Commission, New Delhi.

National Institute of
Community Development, Hyderabad.
April 4, 1968.

GEORGE JACOB
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COMMUNICATION IN INDIA
Experiments In Introducing Change

INTRODUCTION

ALL attempts at communication are in a sense experimental. Whether messages get through and impart the intended meaning is always somewhat uncertain. This is particularly true of experiments in introducing change. People often resist change, for it may clash with personal and societal values and interests. The study which we report here is part of a communication experiment which tried to induce adoption of modern agricultural, health and family planning practices. Our study evaluates the continuing effects of two communication treatments, radio farm forums and literacy training classes. Our data will show that knowledge about the practices spreads rather quickly. Adoption, however, has been slow and at low levels. It seems obvious that only rarely is there an easy or quick solution to problems of development. As Millikan and Hapgood point out in the title of their book on the dilemma of agriculture in developing nations, there is *No Easy Harvest.*[1] Nevertheless, we will show that some progress was made and we will show clear-cut differences in effectiveness of the communication treatments which were used.

1. M. F. Millikan and D. Hapgood, *No Easy Harvest*, Boston: Little, Brown and Company, 1967.

BACKGROUND OF THE STUDY

THE 1964 AND 1966 SURVEYS

The study on which our report is based is a follow-up of part of a two-nation comparative study initiated in 1964 by UNESCO, Michigan State University, the National Institute of Community Development (NICD) of India and the Programa Inter-americano de Informacion Popular of Costa Rica. The objectives of this study in both Costa Rica and India were: (1) to determine the impact of different means of communication on the spread of agricultural, health and family planning practices; (2) to determine the factors affecting the acceptance of innovations; and (3) to describe the total process of diffusion of innovations. Our report deals only with the Indian data and focuses on the first objective, that of evaluating the effectiveness of communication treatments.

The location of the site for the study in India was near the city of Lucknow, Uttar Pradesh, mainly because of the proximity of facilities for conducting the communication treatments. Literacy House, an adult literacy training center, is located there and was willing to co-operate with the project in the literacy classes treatment. It was also possible to secure the co-operation of the All-India Radio outlet in Lucknow for the treatment of the radio farm forums. Additionally, competent research investigators who knew the local language were available as Lucknow University has large departments of Anthropology, Sociology and Social Work.

Villages were selected from a pool of 24 similar villages near Lucknow on the basis of available statistical data, so as to make them as alike as possible. Factors

such as per cent of off-farm employment, proximity to the city of Lucknow, and amount of cultivable land were considered. Three villages were re-selected when it was found that they would be inaccessible during the rainy season but otherwise the statistically selected sample was retained.

In 1964, a benchmark survey was made of the study villages to establish the level of knowledge, trial and adoption of selected agricultural, health and family planning practices. Information was also obtained on variables usually associated with adoption. Then, in 1965, an experiment was conducted in which the communication treatments of literacy classes and radio farm forums were applied to two pairs of villages but not to a third pair on which benchmark data were also obtained.[2] In 1966, a re-survey was made of the same respondents to examine the effects of the treatments on various factors, especially the knowledge, trial and adoption of the selected practices. The details of this sampling and selection are given elsewhere and will only briefly be summarized here.[3] The selection of villages and respondents from 1964 to 1966, of course, set the limits for our re-survey in 1967.

The communication treatments were started in February, 1965, and continued for about a year. We will discuss each treatment briefly to indicate how it was used to stimulate interest in using new practices.

2. A third communication treatment, 'animation', was also applied to two villages. Animation is a method of intensified oral communication on rural development designed to develop local leadership. Although this communication training method has had considerable success in India and elsewhere, differences in adoption of practices between the animation experimental villages and the control villages were so slight as measured in 1966 that the animation villages were dropped from the 1967 re-survey.

3. This description of the 1964 and 1966 surveys is largely taken from P. Roy, *The Impact of Communications on Rural Development in India*, Hyderabad: National Institute of Community Development, 1967. (Mimeo).

RADIO FARM FORUMS AS A COMMUNICATION TREATMENT

Radio farm forums were introduced by the All-India Radio network in 1949 as a means of enhancing the informational and motivational values of radio-listening. A forum consists of from 10 to 20 villagers who gather together to listen to programs about farm problems. They elect a secretary who keeps minutes of the discussions of the meetings which follow the broadcast. A rotating chairman who leads the discussions is elected for each broadcast. Requests for additional information or about adaptations of recommendations to local conditions may be sent to the radio station. Hired action leaders are also used. These guide discussions, if necessary, and give advice on putting the information to use. For example, if a farmer had losses from rats he would be encouraged to obtain poison and told how to use it in his own storage shed.

There was one radio farm forum in each of the two radio-treatment villages. One had nine members and the other had 14 members. Each forum was provided with a transistorized radio set and members listened to about 100 half-hour talks, which focussed on improved agricultural and health practices. Weather forecasts and other farm information were usually incorporated into the programs. The broadcast schedule was designed to try to match seasonal variations in farm work. Some talks were repeated for emphasis. For example, talks on the modern plow and on fertilizer usage were given before both the *rabi* (winter) and *khariff* (rainy) planting seasons. Complicated practices like Japanese method of paddy cultivation were discussed in sub-topics to take up the separate practices which

were part of the whole recommendation of this method of cultivation. In all, the talks provided a maximum of about 50 hours of exposure to radio and about 100 opportunities to participate in or listen to radio farm forum discussions.[4]

Attendance varied considerably, from 30 to 90 per cent, with some members being chronically absent and attendance generally dropping during busy work seasons. Many people who were not members of the radio forums attended various broadcasts and, of course, this was one of the intents of the programs. It was intended to obtain a 'two-step flow of information' from radio to opinion leaders and innovators who attended the forums, and then from these to the larger population of cultivators in the village. Thus there were 'primary' audiences of listeners and 'secondary' audiences of cultivators who had the information passed on to them. Analyses of these two audiences are part of the report on the 1964 and 1966 data.[5] It was largely this passing on of new information and the consequent changing of social and cultural values which, it is inferred, resulted in the differences observed in 1967 between the experimental and control villages. These differences are reported in our present study.

An example of how social and cultural factors were altered through the advocacy in a radio forum of a new practice is that of rat poison. Cultivators were generally familiar with the idea of rat poison but few would use it openly because its use involved the killing of a living being. Such killing was felt to be proscribed by caste and religion. Even though some cultivators were using rat poison themselves, they openly dis-

4. *Ibid.*
5. *Ibid.*, pp. 35-38.

couraged its use by others for social reasons. This problem was especially acute in a village with a large number of *chamars* (a caste near the bottom of the Hindu social ladder) who were trying to raise their status by rigorous emulation of upper castes. In this village, the rat problem became acute as a result of following the proscription against their killing. The first radio program and discussion on rat poison was not very effective because the matter was considered too delicate to discuss publicly. A later talk gave additional information and vividly called attention to the losses incurred as a result of rats. Listeners became more interested then and, in subsequent discussions, it was decided that use of rat poison was not such a serious violation of caste or religious prescription and could be adopted. In fact, knowledge and adoption of rat poison reached such high levels by 1966 that the practice no longer discriminated satisfactorily among respondents and was dropped in the 1964-66 comparisons.

LITERACY CLASSES AS A COMMUNICATION TREATMENT

Like the radio farm forums, literacy classes were used as a vehicle for diffusing information about improved practices and for promoting their adoption. Unlike the radio forums, the literacy classes had a major separate goal, that of teaching people to read and write. The 1961 Census of India shows a literate population of only 24 to 34 per cent for men and 13 per cent for women. For several reasons, only male literacy classes were started. Women do not play as important a role as men in agricultural decision-making; it is more difficult to recruit women teachers and organize a sustained women's literacy class; partici-

pation in the radio farm forums, as expected, was exclusively confined to males and there was only rarely a female listener of the programs.[6] As our chief purpose was to compare communication treatments on as equal a basis as possible, only male literacy classes were started.

The literacy experiment was organized in coordination with Literacy House, an adult literacy training center in the city of Lucknow. The program involved both literate and illiterate men. For literates, reading forums were organized and village libraries were established. For illiterates, literacy classes were started. At the end of these classes, when reading proficiency had been obtained, the groups were converted into reading forums. The literacy material consisted largely of description and advocacy of agricultural, health and family planning practices. It was expected that constant reference to the practices in the literacy classes and reading forums would promote adoption of the practices. Pamphlets designed to promote improved practices were mostly written especially for project use by Literacy House staff. In all, 15 pamphlets were published with such titles as 'Increase wheat yields with improved seed' and 'Rat — an enemy of crops' (English translations).

Two classes of 25 participants each, met in one of the literacy treatment villages and one class of 35 members met in the other village. The classes met for about a year, for two-and-a-half hours daily, six days a week, from 8.00 to 10.30 p.m. Hindi Devnagari

6. Women do listen to the radio when it is available, but not as often as men. In a previous study we found that, of 680 male cultivators, two-thirds reported that their family did no radio-listening while less than one-quarter of the cultivators themselves reported that they did not listen to the radio. See P. Roy, F. C. Fliegel, J. E. Kivlin and L. K. Sen, *Agricultural Innovation among Indian Farmers*, Hyderabad: National Institute of Community Development, May, 1968.

script was used. Participants were relatively young, ranging from 15 to 45, and were from widely different castes. Attendance varied from 30 to 100 per cent.

An important part of the literacy classes communication treatment was the reading forum discussions. As in the radio farm forum, these consisted of discussions of the material on improved practices which was being used in the literacy classes or read in the reading forum by the more advanced readers. Each forum had a rotating group-leader whose duty it was to guide the group on the selected subject. As in the radio forums, an attempt was made to introduce the various innovations in a timely manner and an action worker was on hand at times to also guide discussions and to promote adoption of the innovations. There were about 50 reading forum discussions held in each literacy treatment village.

THE 'NO TREATMENT' CONTROL VILLAGES

The two control villages were not subjected to any special communication treatment. Like the experimental villages, however, they received routine attention from community development block headquarters and from other government agencies. It is possible that the experimental villages received some additional attention from government officials as a function of being singled out for the communication treatments, but this was not noticeable. In any case, we could not hope to conduct our experiments in a social vacuum. Comparisons of relative positions on various factors among the experimental and control villages will show that the three sets of villages did not differ very much in 1964 when the benchmark survey was taken. Like the experimental villages, the control villages were selected

from a pool of 24 similar villages near Lucknow on the basis of available statistical data, so as to make them as alike as possible. The control villages, then, were similar to the experimental villages except that we did not conduct communication treatments in them.

THE SAMPLE FOR THE 1967 SURVEY

The benchmark survey taken in 1964 was a nearly complete enumeration of all male heads of households in eight villages for a total of 702 interviews. A detailed presentation of some social characteristics of people living in these villages in 1964 is given in the earlier report.[7] In the 1966 re-survey, there was a reduction in the size of the sample to 463 respondents because non-cultivators were deleted from analysis and because of death, migration or non-availability of respondents. In the 1967 re-survey there was a further reduction in number of cases because of the deletion of two villages in which the 'animation' communication treatment was applied.[8] Additionally, nine respondents had died or moved away in the lapse of a year from 1966 to 1967. In the six remaining villages (two radio, two literacy, two control), there were 291 respondents who had been interviewed both in 1964 and in 1966. Of these, interviews were obtained in 1967 from 279 cultivators, or 96 per cent of those available. There were no refusals. Most of the 12 cultivators who could not be located, worked in the city of Lucknow.

A few characteristics of the 279 respondents as of 1966 are given as comparisons among the three sets of villages, radio, literacy and control (Table 1). The

7. P. Roy, *The Impact of Communications . . . , op. cit.*, pp. 24-34 and Appendix.
8. See footnote No. 2.

Table 1: Selected Characteristics of Respondents, Communication Treatment and Control Villages Compared, 1966

Education	Radio (N = 78)		Literacy (N = 112)		Control (N = 86)	
	Respondent	Respondent's wife	Respondent	Respondent's wife	Respondent	Respondent's wife
	per cent					
No education ...	71	99	55	91	82	99
Up to 4 ...	24	1	19	5	11	1
5 to 8 ...	5	0	22	4	6	0
9 to 12 ...	0	0	4	0	1	0
	100	100	100	100	100	100

Average age of respondent	Radio (N = 79)	Literacy (N = 112)	Control (N = 87)
	42	40	44
Average number of family members	Radio (N = 79)	Literacy (N = 112)	Control (N = 87)
	5.28	6.17	5.49
Per cent of joint families	Radio (N = 79)	Literacy (N = 113)	Control (N = 87)
	29	44	33
Tenure status of respondent	Radio (N = 78)	Literacy (N = 108)	Control (N = 87)
		per cent	
Landless tenant	0	2	0
Part owner, part tenant	22	18	24
Full owner	78	80	76
	100	100	100

three sets of villages were generally similar in 1966. The control villages had the highest percentage of respondents with no education. In all of the villages, there were very few wives with any education at all, the literacy villages having 9 per cent wives with some education. Average age of respondents ranged narrowly from 40 to 44 with a similar small spread in average number of family members, from 5.28 to 6.17. The latter figure, of course, speaks graphically of the present problem of population growth. At these levels of family size the population would double in about 30 years.

The widest difference among sets of villages in this limited comparison was in per cent of joint families, which varied from 29 to 44 per cent. The criterion for jointness was two or more complete nuclear families (husband and wife and children, if any) who ate together. We attach no particular importance to the differences among the sets of villages. In another study we found that family composition, whether joint or nuclear, was not importantly related to agricultural adoption or to most other variables.[9]

The sample for the present study then, was composed of 279 respondents, all of whom were males who had cultivated some land during the time of the study. They had all been interviewed in 1964 and 1966 whether or not they participated directly in the communication treatments.

SELECTION OF PRACTICES

Practices were selected in 1964 on the basis of four major criteria: (1) applicability in all of the sample villages; (2) salience to both villagers and agencies of

9. P. Roy, *et al.*, *Agricultural Innovation . . . , op. cit.*

change; (3) suitability to be included in the communication treatments; and (4) adoption level ranging from 0 to 60 per cent with a potential for increasing by the end of the experiment. There were 30 practices which seemed to meet these criteria in 1964. Sixteen agricultural, health and family planning practices were selected from among these to make internally consistent indexes with which to measure change over time. The above criteria, Guttman scaling, correlation analysis, and comparability for 1964, 1966 and 1967 in the present study were used as the basis for deletion of practices. The practices are listed below.

AGRICULTURAL PRACTICES

Japanese method of paddy cultivation
Superphosphate
Line-sowing of wheat
Improved potato seed
Green manure
Ammonium sulphate
Insecticides
Modern plow
Three or five-tine cultivator
Animal disease innoculation

HEALTH PRACTICES

PRAI latrine (Planning Research and Action Institute)
Smokeless *chula* (stove)
Bed-bug killer
Modern child-birth practices
TABC (innoculation for one or more of the diseases of cholera, typhoid, small-pox)

FAMILY PLANNING

Birth control, any method

Most of the practices are self-evident. For example, 'superphosphate' or 'improved potato seed' simply refers to use of these two items. Line-sowing of wheat is an improved method introduced about 15 years ago to reduce the amount of seed required and to ensure the optimum planting distance. However, considerably more labor is required for this method of planting which contrasts with broadcasting. By modern plow is generally meant a steel or iron moldboard-type implement, which contrasts with the wooden *desi* plow. Many cultivators now use both plows. The three or five-tine cultivator is another 'modern' steel or iron implement, and is of course dependent upon line-sowing of crops for successful use.

The Japanese method of paddy cultivation is a package of practices, all of which must be taken up in order to achieve the optimum results. The most common component practices of the package are improved seed, seed treatment, adequate irrigation and drainage, special preparation of the seed bed, line-sowing, use of fertilizer and pesticides, and interculture or cultivating to control weeds. The practices are sometimes taken up individually, with line-sowing and interculture often omitted.

Of the five health practices, only bed-bug killer, usually a product called Gammaxene, is self-evident. The PRAI latrine is a locally constructed water-seal latrine, the water being poured into the latrine with a bucket by the user. Wastes flow into an underground septic tank where decomposition takes place. Originally the latrines were subsidized but subsidies are no longer given.

The smokeless *chula* is a stove designed to use fuel and remove smoke more efficiently than unimproved models. It usually provides more cooking surfaces. The smokeless *chula* is unique among our 16 practices, in that there were no users in any village in any of the three years for which we present data. The chief reasons for non-adoption seem to be that some models in neighboring villages were anything but smokeless and that villagers like to move their stove about, both indoors and outdoors. The smokeless *chula* has a fixed location and also has a higher initial cost.

Modern child-birth practices were taken to mean attendance at birth by a trained midwife or doctor, either at home or in a hospital. TABC usually refers to a single innoculation giving protection against two or more diseases. In our study, any single or combined innoculation against cholera, typhoid or small-pox was taken as adoption of TABC. Family planning referred to any method of birth control, including indigenous methods such as withdrawal. The comparisons that follow, then, are for ten agricultural practices, five health practices, and family planning by itself as one practice.

INTERVIEWING AND THE 1967 INTERVIEW SCHEDULE

For the 1967 re-survey, which was conducted in September and October, a single interview schedule was prepared. It was translated into Devnagari (Hindi) script and was administered by experienced interviewers knowledgeable in the Avadhian-Hindi dialect of the Lucknow area. Question format and coding necessarily followed that of the 1964 and 1966 surveys so as to permit comparisons across years. Coding was done on the schedules, especially prepared for this purpose, so that IBM punching and verifying could be

done directly from the schedules. This was done and averages and percentages were calculated from these data. Comparable averages and percentages were also calculated from the 1964 and 1966 data obtained from the same 279 cultivators who were interviewed in 1967. These comparisons provide the basis for analysis in the present study.

ANALYSIS — KNOWLEDGE, TRIAL AND ADOPTION OF PRACTICES

Our chief comparisons are those between the two communication treatments of literacy classes and radio farm forums and between the communication treatment and the control villages. Presumed to have been constant for all three sets of villages were the normal block development programs. These on-going programs were expected to result in increases in adoption and other factors in all villages over the time period which was studied. Statistical tests for the significance of differences in grouped averages and percentages (*T*-tests) were run only for the 1967 data, which are reported here for the first time.[10] Changes from 1964 to 1966 to 1967 are apparent for most variables in the Tables we present. We will note these changes but have not made statistical tests of the differences across years or of the differences across sets of villages for 1964 and 1966. To repeat, tests of significance were used to compare treatment effects in 1967 only. The 5 per cent level of significance was used in all Tables.

First, we discuss knowledge, trial and adoption of agricultural, health and family planning innovations. These provide a direct test of the efficacy of the com-

10. Comparisons for the 1964 and 1966 data are also given in P. Roy, *The Impact of Communications . . . , op. cit.* These differ slightly from those we present here because of the larger sample used in 1966.

munication treatments. Then, we consider other, more indirect consequences such as an increase in the number of change agents known or in the amount of radio-listening. Increases in such reactions are likely to result in higher knowledge and adoption, for these variables are usually positively related with both knowledge and adoption of practices.

In general, to anticipate our data somewhat, the radio farm forum treatment villages showed significantly more progress than the literacy and control villages. This was true whether measured by adoption or by other variables. There was some tendency for the literacy villages to score higher than the control villages but usually these differences were not statistically significant. In only two of the 1967 comparisons did the control villages score highest.

KNOWLEDGE, TRIAL AND ADOPTION OF AGRICULTURAL PRACTICES

The chief emphasis in the communication treatments was on agricultural practices. Over 80 per cent of India's people live in rural areas and most of them are engaged in agriculture. In Table 2 we present the average number of agricultural practices known in each of the three sets of villages for each of the years, 1964, 1966 and 1967. This format will be used throughout our analysis to compare communication treatments. We would like to stress once more that the same practices, same respondents and identical questions to obtain data were used for all three years in these Tables. Thus, while perceptions of our questions by respondents have undoubtedly altered over time in some respects, we have attempted to make a continuing study of comparable data to show changes which are fundamental to development.

Table 2: Average Number of Agricultural Practices Known, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967**
Radio farm forum* ...	6.38	9.51	8.98
Literacy classes*	5.89	7.92	8.81
Control (no treatment)* ...	6.33	8.48	8.60

* For this and succeeding Tables in this report, there were two radio farm forum treatment villages, N = 79, two literacy classes treatment villages, N = 113, and two control villages in which there were no communication treatments, N = 87. There were only negligible missing data in any of the Tables.

** For this and succeeding Tables, differences significant at the .05 level will be indicated, for 1967 figures only. *T*- ests for significance of the differences between means and between percentages were used. None of the differences in the 1967 figures for this Table was significant. Non-significance of differences should be assumed in succeeding Tables in the absence of statements of significance.

There were substantial increases in knowledge of our ten agricultural practices in all three sets of villages from 1964 to 1967 but averages for the sets of villages did not vary significantly in 1967 (Table 2). However, what proved to be the predominant pattern in our comparisons is shown in these 1967 averages in that the radio villages are highest, 8.98, followed by literacy villages, 8.81, with control villages having the lowest average, 8.60. The total possible knowledge was of ten practices, the first ten listed earlier. It is evident that knowledge of these agricultural practices was widely diffused by 1967 and that average knowledge had 'peaked' close to the upper limit of ten, so that we could not discriminate among communication treatment and control villages on this variable. The small decline in average number of practices known in the radio villages, from 9.51 in 1966 to 8.98 in 1967, is probably the result of poor recall by some cultivators in 1967.

There were significant differences in average number of agricultural practices tried between radio and literacy and between radio and control villages (Table 3). The average for radio villages was highest. Literacy villages were only slightly higher than control villages. All sets of villages showed increases in practices tried from 1964 to 1967. These averages for practices tried must be viewed with considerable caution; although the figures probably reflect accurately the relative positions of radio, literacy and control villages in the matter of practice trial, they do not necessarily reflect disadoptions. That is, the figures for trial (Table 3) are higher than those for adoption (Table 4). Similarly, the figures for trial (Table 3) are lower than those for knowledge (Table 2). It is not necessarily so that cultivators were not interested in trying practices after gaining knowledge of them or that they tried and voluntarily disadopted some practices. Drought and flood conditions, non-availability of supplies and services, cropping changes and other factors making a practice non-relevant to a particular farm, could all result in fewer trials than knowledge and more trials than adoptions. Voluntary disadoptions of relevant practices, of course, do occur and are a fruitful area for study but our data do not permit a careful examination of them.

Table 3: Average Number of Agricultural Practices Tried, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	2.75	5.44	6.68
Literacy classes	2.42	3.46	4.57
Control	2.68	3.38	4.47

* Differences between radio and literacy and between radio and control significant at .05 level.

Table 4: Average Number of Agricultural Practices Adopted, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum	2.58	4.84	5.90
Literacy classes	2.21	2.83	3.38
Control	2.43	2.71	3.45

* Differences between radio and literacy and between radio and control significant at .05 level.

In Table 4 we present averages for number of agricultural practices adopted. Again, the radio villages have a significantly higher average than the literacy and control villages but on this factor, control villages have a slightly higher average than literacy villages. These figures for average adoption are the most valid evidence we have of the greater efficacy of the radio farm forums in promoting adoption of innovations. An average of almost six out of ten practices were adopted in the radio villages as compared to less than four out of ten for literacy and control villages. This evidence is hardly conclusive, for we have dealt with only one experiment, all aspects of which were in some respects unique. Another experiment, in another place, conducted somewhat differently, might show quite different results. Nevertheless, combined with the other data which we present, the comparisons on average adoption argue strongly for the promotional qualities of radio farm forums.

KNOWLEDGE, TRIAL AND ADOPTION OF HEALTH PRACTICES

Figures for the average number of health practices known, tried and adopted follow the pattern which emerged in our analysis of agricultural practices.

These averages are based on our five health practices listed earlier. Radio villages had a significantly higher average than one or both of the other sets of villages, while the literacy villages scored higher than the control villages, but not significantly so (Tables 5, 6 and 7).

Table 5: Average Number of Health Practices Known, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	1.57	2.29	3.47
Literacy classes	1.19	2.79	3.25
Control	1.26	1.88	2.91

* Difference between radio and control significant at .05 level.

Table 6: Average Number of Health Practices Tried, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	0.66	0.89	1.56
Literacy classes	0.68	1.08	1.13
Control	0.74	0.73	1.03

* Difference between radio and control significant at .05 level.

Table 7: Average Number of Health Practices Adopted, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	0.61	0.82	1.11
Literacy classes	0.62	1.00	0.68
Control	0.69	0.60	0.57

* Differences between radio and control and between radio and literacy significant at .05 level.

Health practices have a different relationship to the whole complex of development factors than do agricultural practices. There are more social welfare and fewer direct economic implications to health practices. There is also more emotional involvement and a greater sense of urgency for adoption in a crisis situation. Furthermore, some practices like malaria control measures may be quite involuntary. However, only TABC of our five health practices had some aspects of involuntary adoption. School children were sometimes involuntarily innoculated. TABC and modern child-birth practices also suffered somewhat because of non-availability of medical services in the villages. This resulted in some seeming disadoptions of health practices.

An average of about three out of the five health practices were known in 1967 (Table 5). There was little difference among the three sets of villages. Considering that information about these practices has often been disseminated, this average level of knowledge can be considered low. The reason for this relatively low level of knowledge probably lies in part in the very low levels of trial and adoption (Tables 6 and 7). Widespread knowledge depends in part on trial and adoption by a few innovators who then report their success to others and spread information about a practice. Average trial and adoption figures ranged from a low of 0.57 average adoption in 1967 in the control villages to a high of only 1.56 average trial in the radio villages for that year.

In all six villages combined, there were ten respondents who disclaimed knowledge of any health practices whatsoever in 1967. This is unusual if only because these people had been asked about these same

practices in 1964 and in 1966. There were 53 respondents who had not tried any practices and 126 respondents who were not currently using any health practices in 1967. These low levels of knowledge, trial and adoption are probably indicative of the general situation in regard to health in many Indian villages. The health situation *per se* would not seem to be particularly alarming by local definition. Despite a shortage of trained medical personnel and a shortage of economic means of villagers to afford medical services, there were no crucial health problems reported in our study villages, although infant mortality was reported to be high. One of the most important implications of our health data may be that of a low level of concern for family planning. Past experience in attempts to reduce birth-rates has generally been that concern for family planning follows and does not precede concern for better health. People must first appreciate that smaller numbers of children will have a good chance of surviving. It is true, of course, that the first effect of health control measures is to add to the population by decreasing the death-rate, but there seems to be no easy way around this temporary result. We will take up family planning as an improved practice in a later section and will demonstrate that while knowledge of at least one birth control technique was high, adoption was at a very low level.

KNOWLEDGE AND ADOPTION OF INDIVIDUAL PRACTICES

To conclude our discussion on the 15 agricultural and health practices, we present data on knowledge and adoption of the individual practices (Tables 8 and 9). These Tables follow for most practices the pattern which has emerged in the grouped data. Radio

Table 8: Per cent of Respondents Having Knowledge of Practices, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

	1964			1966			1967		
	Radio	Literacy	Control	Radio	Literacy	Control	Radio	Literacy	Control
	per cent								
Agriculture—									
JMRC ...	65	52	63	92	76	78	87	77	85
Superphosphate ...	49	47	47	78	60	69	96	93	90
Line-sowing of wheat	78	85	79	99	95	84	95	98	90
Improved potato seed	16	16	16	94	85	68	73	66	77
Green manure ...	67	74	61	90	88	69	85	81	87
Ammonium sulphate	96	91	93	97	74	86	96	97	91
Insecticides ...	82	77	76	95	87	79	99	94	93
Modern plow ...	99	80	82	100	98	91	100	99	100
3 or 5-tine cultivator	14	8	30	82	66	67	80	73	67
Animal innoculation	73	67	74	91	75	79	90	89	82
Health—									
PRAI latrines ...	35	15	7	49	51	38	74	71	53
Smokeless *chula* ...	1	5	1	9	37	7	42	38	28
Bed-bug killer ...	22	28	20	44	58	29	73	55	57
Modern child-birth practices ...	20	8	14	38	50	30	72	72	62
TABC ...	77	67	80	90	88	72	95	94	92

Table 9: Per cent of Respondents Having Adopted Practices, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

	1964			1966			1967		
	Radio	Literacy	Control	Radio	Literacy	Control	Radio	Literacy	Control
	per cent								
Agriculture—									
JMRC ...	19	7	18	22	5	15	59	11	40
Superphosphate ...	10	14	28	49	20	35	78	39	29
Line-sowing of wheat	24	19	14	56	46	18	71	52	48
Improved potato seed	16	11	13	42	29	22	46	24	22
Green manure ...	10	21	14	15	31	11	34	18	11
Ammonium sulphate	73	54	67	70	24	57	72	52	53
Insecticides ...	42	29	45	41	43	28	80	35	54
Modern plow ...	41	45	34	77	66	59	90	76	67
3 or 5-tine cultivator	1	3	1	4	3	1	6	4	3
Animal innoculation	23	21	10	24	27	27	52	28	14
Health—									
PRAI latrines ...	1	2	1	4	2	6	3	3	0
Smokeless *chula* ...	0	0	0	0	0	0	0	0	0
Bed-bug killer ...	15	10	8	13	42	8	33	5	9
Modern child-birth practices ...	1	2	2	3	6	6	8	16	9
TABC ...	44	52	55	62	51	24	70	44	38

villages generally had a considerably higher percentage of adoption in 1967 than either literacy or control villages. Literacy villages were sometimes higher than control villages but not markedly so. The contrasts in percentages for knowledge were less striking.

The three sets of villages were roughly similar in knowledge of practices in 1964 (Table 8). Radio villages had the highest per cent knowledge in that year on seven of the 15 practices while in 1967 they had the highest per cent knowledge on nine of the 15 practices. Seven of the 15 practices had 'peaked' in knowledge at over 90 per cent in 1967 in one or more of the three sets of villages.

With much less 'peaking' occurring to flatten possible comparisons, the percentages for adoption of the individual practices show clearly the leading position of the radio villages (Table 9). Only for modern child-birth practices, at a low level of adoption, were the figures lowest for the radio villages. For three or five-tine cultivator and PRAI latrines, the percentages were also at low levels and the position of the radio villages was not clearly leading. As we have pointed out earlier, there were no adoptions of the smokeless *chula* in any villages in any year. For all other practices, the radio villages had the highest per cent adoption.

KNOWLEDGE AND ADOPTION OF FAMILY PLANNING

India's population is conservatively estimated to be about 520 million. Recognition of the mounting concern with which this problem of population size and growth is viewed may be had in the intensified action programs of the Government of India, the United Nations and other interested agencies. Films,

slides, posters and the family planning red triangle symbol may be seen everywhere in urban areas. Although such promotional efforts are much less in view in India's 520,000 villages, we found a steady rise in our study villages in knowledge of family planning (Table 10).

Table 10: Per cent of Respondents Who Knew About Family Planning, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967
Radio farm forum ...	37.97	82.28	83.54
Literacy classes	45.13	84.96	86.73
Control	29.86	73.56	86.21

In 1964, knowledge of family planning ranged from 29.86 per cent in the control villages to 45.13 per cent in the literacy villages. Reflecting the increased publicity given to family planning in 1965 and 1966, figures approximately doubled for all three sets of villages in 1966. There were much smaller increases from 1966 to 1967. Surprisingly, the control villages made the greatest gain in knowledge of family planning from 1964 to 1967, and the radio villages had the lowest percentages of knowledge of family planning in 1967. However, differences among the three sets of villages in 1967 were not significant. It is apparent that there was wide-spread knowledge of family planning in 1967 and that the communication treatments did not produce lasting differences. Viewed another way, we may say that the regular block programs and other channels of communication had brought the information to all of the villages, including the control villages.

Before we present additional family planning data, we would like to indicate that these data are probably conservative. That is, it is likely that they underestimate the amount of knowledge and adoption of family planning. This is not only because family planning is still an essentially private and non-discussed topic for many villagers but also because someone other than the respondent and the interviewer may have been present during the interviewing. It is likely that this stifled some affirmative responses. Although we would have preferred an isolated interview situation, crowded village conditions and the constant presence of others made this difficult to attain without risk of losing rapport and arousing suspicion. We wished to maintain the excellent rapport established in 1964 and 1966 and followed the practice used in those years of not insisting on complete privacy for the interview. Also, the primary focus of the study, especially in the communication treatments, was on agricultural practices. Therefore, we accepted less than ideal conditions for interviewing on family planning questions.

The format for determining whether a respondent knew about family planning was to first ask 'Have you ever heard about family planning?' If the response was 'yes', which was the case for most respondents, then they were asked, 'What different methods of family planning have you heard about?' In this way we could verify by a correct answer whether knowledge was in terms of an actual method or if only the rubric of family planning was familiar. We could not determine, of course, whether the knowledge was functional but we could make some inference from the fact that few respondents had tried or were using any method of family planning, as we will show below.

The radio villages knew about significantly more methods of family planning than either the literacy or control villages (Table 11). The control village average, 1.62, was slightly higher than the literacy village average, 1.49.

Table 11: Average Number of Family Planning Methods Known, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	†	1.95	2.04
Literacy classes	†	1.90	1.49
Control	†	1.36	1.62

† Data were not obtained in 1964.

* Differences between radio and literacy and between radio and control significant at .05 level.

Respondents predominantly mentioned the methods of vasectomy and IUCD (Intra-Uterine Contraceptive Device), (Table 12). These data are for all six villages combined. It is likely that indigenous methods, including withdrawal and abstention, might have been mentioned more often had the interviewing situation been focussed on family planning. The responses shown in Table 12 clearly indicate, however, that knowledge of currently advocated practices is widely disseminated and that the problem for the future is not so much of information as of motivation.

Both the IUCD and vasectomy are methods in which user technique is not a problem. Unknown for the present sample is how successful respondents would be in practising methods dependent upon proper technique for success. This is probably a crucial factor and further advances in technology are needed to develop methods less subject to failure but which also permit desired reproduction.

Table 12: Knowledge of Different Family Planning Methods, Communication Treatment and Control Villages Combined, 1967

Method	Number who mentioned method*
Vasectomy	229
IUCD (Loop)	124
Sheath (Condom)	28
Vaginal foam pills	28
Female sterilization	27
Abstention	14
Oral pills	9
Rhythm	6
Diaphragm	2
Withdrawal	1
Other methods	2

* Respondents were first asked if they had heard about family planning. If they responded 'yes', they were then asked 'What different methods of family planning have you heard about?' Responses were recorded only if the respondent himself mentioned the method; respondents were not asked if they knew about each method. Some respondents mentioned more than one method.

Table 13: Per cent of Respondents Who Had Adopted Family Planning, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	6.33	8.86	11.39
Literacy classes	1.77	7.96	2.65
Control	1.15	3.45	5.75

* Difference between radio and literacy significant at .05 level.

Few respondents practised family planning (Table 13). The percentage for the radio villages was

significantly higher than that of the literacy villages which declined from 1966 to 1967. The latter were lower than the control villages. However, the radio villages were considerably higher than the other villages before the communication treatments began, and we do not attach much importance to the differences among villages in 1967. Perhaps the most important conclusion is that levels of adoption of family planning are low but seem to be rising slowly. There does not seem to be much promise for rapid reduction of the birth-rate until death-rates, particularly infant mortality rates, decrease still further and there are economic incentives to have smaller families.

ANALYSIS — VARIABLES ASSOCIATED WITH ADOPTION

So far, in our discussion of the continuing effects of the communication treatments conducted in 1965, we have examined only knowledge, trial and adoption of the practices selected for study. Now, we will look at some variables commonly associated with practice adoption to see if there were changes in them in 1967 which will help us to evaluate the communication treatments. These variables in themselves can be considered as measures of social change. Most of them, like extension knowledge and contact, functional literacy, and exposure to mass media, are consistently found to be positively related to adoption of innovations and are often used as indicators of modernization. It seems obvious that they would be related to technological change and modernization. A principal means of learning about new practices is through some extension organization or *via* print and other mass media. Personal communication channels are also important,

but the information for the leaders and the innovators comes chiefly through impersonal contact with the larger society. From the innovators, information and persuasion flow outward to the bulk of the cultivators and reinforces the impact of the mass media.

As with knowledge, trial and adoption, we present averages and percentages to compare the radio, literacy and control villages. We will present data for 1964, 1966 and 1967 but focus our attention on the 1967 figures, for which we make statistical comparisons. Having had the advantage of the earlier study, comparing the 1964 and 1966 data,[11] it hardly seemed fair to formally hypothesize direction of differences. It seemed likely that the trends shown then in favor of the radio villages would continue and this is in fact what we found. The results are not so conclusively in favor of the radio villages as with the knowledge, trial and adoption data, but then some of the variables are much more complex and would not be influenced by the communication treatments as readily as would adoption behavior.

EXTENSION KNOWLEDGE AND CONTACT

We measured extension agent knowledge by making a simple index of number of change agents known (Table 14). Radio village average scores were significantly higher than those for literacy and control villages.

For extension agent contact we also constructed a simple index, using the same agents on which the extension knowledge index was based (Table 15). Here, however, the results were opposite to those we had expected. Control and literacy villages had signi-

11. *Ibid.*

ficantly higher average index scores than the radio villages. This reversal of what had been a consistent trend in the direction of higher averages for the radio villages seems attributable to two factors. First, a very popular village level worker (VLW), lived in one of the control villages and second, the control villages were much nearer to block headquarters. These facts are reflected in the 1964 figures (Tables 14 and 15). Control villages had a somewhat higher average score for extension agent knowledge (Table 14), and a substantially higher average score for extension agent contact in 1964 (Table 15). Average scores increased considerably for all three sets of villages from 1964 to 1967 on both variables, however, and the increases from 1964 to 1967 are highest for radio villages and lowest for control villages.

Table 14: Average Score, Index of Change Agents Known, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967†

Treatment	1964	1966	1967*
Radio farm forum ...	3.47	4.86	7.75
Literacy classes	4.01	4.96	7.14
Control	4.22	4.63	6.55

† Change agents were block development officer, midwife, block doctor, village level worker, agricultural development officer (ADO) for agriculture, ADO for co-operatives, ADO for panchayat (village council), veterinary doctor, school-master, *pradhan* (president of village panchayat), block *pramukh* (head of block council). A respondent received a score of '1' if he knew the role of the change agent and a score of '2' if he knew the name of the change agent. Scores thus had a possible range of 0 to 22.

* Difference between radio and control significant at .05 level.

Table 15: Average Score, Index of Number of Times Talked with a Change Agent, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967†

Treatment	1964	1966	1967*
Radio farm forum ...	6.58	7.71	10.75
Literacy classes	9.13	7.83	12.37
Control	10.81	12.77	13.23

† The same 11 change agents listed in the footnote to Table 14 were used for this index of change agent contact. For the VLW and school-master, the number of times talked was divided by 10. For the other nine officials the actual number reported was given, with a maximum of nine. This simple weighting procedure simplified coding and prevented undue weighting by a very popular official or one who lived in the village. Scores thus had a possible range of 0 to 99.

* Differences between radio and literacy and between radio and control significant at .05 level.

We have chosen not to present difference scores showing differences between 1964 and 1967, because of the difficulty of 'peaking' on some variables, as we observed in our discussion of knowledge of agricultural practices. However, it seems clear that these differences in extension agent contact reflect a condition which existed in the study villages when the benchmark survey was taken. We conclude that the general tendency of radio villages to show higher averages and to make greater increases from 1964 to 1967 is not altered by these findings on extension agent contact. A correlative conclusion is that individual extension agents can make their presence felt and that contact with one impression-making agent can precipitate contact of cultivators with other agents. The VLW in the control villages acted as a catalyst for additional extension agent contact. It remains true, of course, that the radio villages generally scored higher on adoption and other variables.

Proximity to block headquarters[12] and the popular VLW in the control villages did not compensate for the apparent effect of the radio farm forum in the radio villages.

LITERACY AND MASS MEDIA CONTACT

Literacy is one of the chief concerns of developing nations. Almost always a matter of national pride, the amount of scarce resources which should be allocated to it remains a matter of some debate. However viewed, literacy is an important indicator of development and we regard it so here. Promoting literacy, of course, was one of the programs by which we sought to induce adoption of innovations. As might be expected, the literacy villages had the highest average number of words correct on our seven-word test of functional literacy (Table 16). However, literacy villages scored only slightly higher than the radio villages. Both literacy and radio villages scored significantly higher than the control villages. We might point out that the literacy villages started with the highest average score in 1964, rose in 1966, but then showed the same score in 1967. The radio and control villages, on the other hand, continued to make modest score increases in each year.

We are inclined to view these findings as an indication that literacy training programs not only do not make a very good vehicle for promoting acceptance of innovations, but that they require a great deal of input for a payoff in increased literacy. The programs were costly in time and money inputs. Time inputs

12. Proximity to block headquarters was not significantly associated with village adoption of agricultural practices in a study of 108 villages in three states of India in 1966. See F. C. Fliegel, P. Roy, L. K. Sen and J. E. Kivlin, *Agricultural Innovations in Indian Villages*, Hyderabad: National Institute of Community Development, 1968, p. 46.

for literacy classes were about 60,000 trainee man-hours and above 2,000 teacher or organizer man-hours. Money costs were about Rs. 14,000. By comparison, time inputs for the radio farm forums were about 2,300 listener man-hours and about 200 trainer or organizer man-hours. Money costs were about Rs. 10,000. This is not to deny that there is often much interest in literacy, or that increases in literacy are not in the long run desirable and, in fact, are probably inevitable. However, it does indicate that literacy improvement is slow in product and return and should be weighed carefully in the allocation of resources.[13]

In all six villages combined, there were 186 respondents who had no words correct in 1967 on our seven-word test and hence, were functional illiterates by this definition. There were 78 respondents who had six or seven words correct and would be considered functionally literate. Percentages of literates and illiterates among the three sets of villages, show the same pattern as the average scores in Table 16. That is, literacy

Table 16: Average Number of Words Correct (functional literacy test of seven words), Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	1.25	2.01	2.33
Literacy classes	1.92	2.69	2.69
Control	0.80	0.95	1.15

* Differences between radio and control and between literacy and control significant, at .05 level. However, the distribution is badly skewed as there were 186 out of 279 respondents who had no words correct.

13. For two discussions of this view, see J. K. Galbraith, *Economic Development*, Boston: Houghton Mifflin Company, 1964, pp. 77-86, and F. C. Fliegel, "Literacy and Exposure to Agricultural Information: A Comparison of some Indian and Brazilian Data", *Behavioural Sciences and Community Development*, 1 (September, 1967), pp. 89-99.

villages had the highest percentage of literates, followed by the radio villages and then by the control villages, which had the highest percentage of illiterates.

Mass media contact was measured by per cent who listen to radio, number of papers read last week, and number of times seen a commercial film last year (Tables 17, 18 and 19). As might be expected, the radio villages showed the highest percentage of radio-listening but differences among the three sets of villages were not significant (Table 17). Radio-listening had more than doubled between 1964 and 1967 for all villages. The radio farm forum villages rose from 23 per cent who listened in 1964, to 86 per cent in 1966, reflecting the communication treatments in 1965. However, also reflecting the termination of the forums, the percentage dropped to 76 per cent in 1967. These high rates of radio listening probably reflect the broad question which was asked, 'Do you listen to the radio?' Listening may well be infrequent.

Table 17: Per cent of Respondents Who Listen to Radio, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967
Radio farm forum ...	22.67	86.18	75.70
Literacy classes	30.22	58.75	66.39
Control	35.46	59.69	71.00

The average number of times the respondent reported having read a paper in the previous week was low for all villages, less than once a week (Table 18). The literacy villages showed a spurt in 1966 but fell back in 1967 to almost the 1964 level. However, literacy villages showed the highest average in 1967.

Figures for the control villages were practically static. As 186 or two-thirds of the respondents in all six villages combined were functional illiterates according to our seven-word test, these low levels of reading were to be expected. To remove the effect of this large number of illiterates we re-calculated the averages for papers read the previous week for literates only and show these averages in the last column of Table 18. The average for the literacy villages was again highest. The control villages showed a higher average than the radio villages but this is probably a function of small sub-sample size. There were only 12 literate respondents in the control villages.

Table 18: Average Number of Times Read a Paper Last Week, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967 All respondents*	1967 literate respondents only
Radio farm forum...	0.11	0.20	0.43	1.36
Literacy classes ...	0.68	0.99	0.75	2.05
Control ...	0.24	0.13	0.24	1.75

* Difference between literacy and control significant, at .05 level. However, the distribution is badly skewed as there were 208 out of 279 respondents who had read no papers.

Reading levels were relatively low among the literate respondents. Thirty per cent of these in all six villages combined had read no paper in the week prior to the time of the interview. It is apparent that print mass media have decided limitations. Although many leaders and innovators can read and do pass on information to promote acceptance of improved practices, this communication channel cannot make

its impact directly upon the bulk of the cultivators. Here, of course, is a dilemma, for we pointed out above that literacy training is a costly input. It is likely that enhanced use of print mass media will have to wait for the larger percentage of children now attending school to move into adult roles. This circumstance, combined with a selection factor favoring the more rational, commercialized and literate cultivators will provide an increased audience for print forums and practice promotion.

The average number of times respondents had seen a commercial film in the year previous to the interview was also very low (Table 19). Differences between radio and literacy villages and between control and literacy villages were significant but these differences should not be considered important as the distribution is badly skewed. There were 207 out of the 279 respondents (74 per cent) in all six villages combined who had seen no films. The only reasonable conclusion is that levels of film-viewing are low and that there is not much indication that they will increase in the near future. The six villages vary somewhat in accessibility to Lucknow but it is doubtful that proximity will become very important in the future. Cultivators are more likely to be restricted by their farming operations and by lack of disposable income than by transportation or proximity problems. This apparent elimination of commercial films as a direct suasive mass media communication channel for this sample probably has greatest implications for family planning promotion. Information about family planning is much more adaptable to mixed, rural-urban audiences than is the promotion of agricultural practices. The most likely use of films as a promotional agent is *via* leaders and

innovators, who do tend to view films in larger numbers and whose film attendance is associated with village adoption of agricultural innovations.[14]

Table 19: Average Number of Times Seen a Commercial Film Last Year, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967

Treatment	1964	1966	1967*
Radio farm forum ...	.35	.30	.90
Literacy classes	.51	.36	.45
Control	.99	.61	1.05

* Differences between radio and literacy and between control and literacy significant, at .05 level. However, the distribution is badly skewed as 207 out of 279 respondents had seen no films.

ATTITUDES TOWARD PROGRAMS OF CHANGE

Most programs of change, almost by definition, can be expected to arouse some opposition. There are usually individuals and groups who feel that they will suffer if change comes. For some, the advantages of the *status quo* are very real. For example, if a wife goes to literacy classes when most wives in the village are illiterate, her husband may suffer much ridicule or distrust by his peers. We were interested, then, in examining attitudes toward programs of change. These attitudes can be taken as an indication of community support for social change programs or as an indicator of village norms and social change itself. They are only expressions of opinion however, and actual behavioral support for change programs would be the more valid indicator.

We constructed a simple index of attitudes toward programs of change and show average scores for the

14. F. C. Fliegel *et al.*, *Agricultural Innovations . . . , op. cit.*, p. 50.

index in Table 20. Figures are given for 1966 and 1967 only, as these data were not obtained in 1964. The responses indicate widespread encouragement for the three actions about which we asked the cultivators: trying a new method of farming, bringing up children in a modern way and a housewife getting more schooling. The last question, about the housewife, received the largest number of unfavorable responses but even here 72 per cent of the responses were favorable, in all six villages combined. There were 174 or 62 per cent respondents who answered 'would encourage' to all three questions. Radio villages had the highest average score, followed by literacy and then by control, but differences were not significant. All three sets of villages showed increases in average scores from 1966 to 1967.

Table 20: Average Score, Index of Attitudes Toward Programs of Change, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967*

Treatment	1964	1966	1967
Radio farm forum ...	†	4.43	5.30
Literacy classes	†	4.04	5.16
Control	†	4.63	4.90

* The index was composed for the following three items, scored '0' for 'discouraged'; '1' for 'indifferent'; and '2' for 'encourage'. In your community would most people encourage or discourage . . . (1) a man who tried a new method of farming . . . (2) a woman who brought up her children not in the traditional way but in a modern way . . . (3) a housewife getting more schooling. Scores could thus range from 0 to 6.

† These data were not obtained in 1964.

Taken at face value, these highly favorable responses indicate widespread social acceptance of adoption of new practices. As we have shown, however, actual

adoption behavior has been far short of this seemingly universal acceptance. We have shown adoption of agricultural, health and family planning practices to be at quite low levels. Even if allowances are made for non-availability of supplies and services, for high infant mortality rates, and for other relevant and rational reasons for non-adoption, actual adoption behavior lags far behind opinions of encouragement for programs or actions which involve change. These expressions of favorable opinions do represent an advantage, however. Cultivators do consider it socially acceptable to give such favorable opinions and this undoubtedly makes the task of the change agent easier.

OTHER MEASURES OF SOCIAL CHANGE

In this section, we present data on four additional variables which are usually associated positively with adoption of agricultural innovations and which we regard here as indicators of social change in our evaluation of communication treatments. The first variable is political knowledgeability (Table 21).

Table 21: Average Score, Political Knowledgeability Index, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967†

Treatment	1964	1966	1967
Radio farm forum ...	1.77	2.38	2.73
Literacy classes	2.06	2.56	2.62
Control	1.77	2.46	2.21

† The political knowledgeability index was composed of the following five equally weighted items: Who was Gandhiji; who was Jawaharlal Nehru; who is the chief minister of Uttar Pradesh; who is the prime minister of India; who is the MLA of your area (member of Legislative Assembly).

We constructed an index of five equally weighted items on knowledge of national, state and area political figures. Such knowledge is presumed to reflect awareness and interest in national and regional affairs in particular and in the world beyond the village in general. Radio villages again had the highest score, 2.73, followed by literacy villages at 2.62 and control at 2.21. These differences were not significant. All three sets of villages showed increases in scores from 1964 to 1967. Respondents more often knew about the two deceased national leaders, Gandhi and Nehru, yet it is surprising to note that in all six villages combined there were 40 per cent who did not know of them. These two leaders are the most prominent in modern Indian history and their pictures are commonly hung in public and commercial buildings as well as in private homes. A larger percentage did not know who was their state chief minister or member of the Legislative Assembly.

Formal social participation is the second of the other measures of social change for which we obtained data (Table 22). Social participation is likely to result in wider horizons, new information and perhaps increased opportunities to obtain the supplies and services necessary to adopt an improved practice. We constructed an index by scoring '1' for membership and '2' for holding office in eight organizations in the village and outside the village. Radio villages scored significantly higher than literacy and control villages, with literacy villages dropping below the control villages in 1967. However, formal social participation was at low levels and there were 101 respondents in all six villages combined who had no membership and held no office.

Table 22: Average Score, Formal Social Participation Index, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967†

Treatment	1964	1966	1967*
Radio farm forum ...	1.19	1.12	2.09
Literacy classes	0.72	1.18	0.81
Control	0.69	1.11	1.15

† The formal social participation index was constructed by scoring '1' for membership and '2' for holding office in the following eight organizations, plus a seldom mentioned 'others': co-operative society, panchayat, youth club, night school, women's club, balwadi (children's school), defence force, school committee.

* Differences between radio and literacy and between radio and control significant at .05 level. The distribution was skewed in that 101 respondents in all six villages combined had zero scores, with no memberships or offices held.

Our next measure is of secularism, the orientation toward secular rather than traditional values (Table 23). Like the other variables we discuss in this section, a high score on secularism bespeaks a generally rational set of values, orientation to the larger society rather than to the village, and predisposition to accept some social change. Radio villages were again found to have the highest score, followed by the literacy villages and then by the control villages. These differences in 1967 were not significant, however. There were only slight increases in all three sets of villages from 1964 to 1967. The distribution of secularism scores in 1967 was reasonably normal with only 17 respondents scoring zero, indicating a traditional response to all questions. No respondent had a secular response to all questions. The item which stood out as inducing a traditional response was 'If your son wanted to marry a low caste girl, would you allow it?' Only 33 or 12 per cent of the respondents answered in the affirmative to this question. In general, all villages scored about midway between the extremes of secular and traditional scores.

Table 23: Average Score, Secularism Index, Communication Treatment and Control Villages Compared 1964, 1966 and 1967†

Treatment	1964	1966	1967
Radio farm forum	3.25	2.30	3.63
Literacy classes	3.41	3.09	3.43
Control	2.88	2.52	3.39

† The secularism index was composed of the following seven equally weighted items in which each 'secular' response was scored '2' for a range of 0 to 14: Can evil spirits cause disease; Have you made sacrifice to prevent sickness; Should Harijans be allowed to draw water from all wells in the village; Should Harijans and other children take meals together in school; If your son wanted to marry a lower caste girl, would you allow it; Do you think Harijans should be allowed to worship in all temples of the village; In your opinion is an illiterate village Brahmin superior to a lower caste B.A. or M.A.? 'Traditional' responses were scored '0'. There were a very few 'no answer' responses which were scored '1'.

The final measure of social change which we present is an index of educational and occupational aspirations for children (Table 24). Again, differences were not significant and all three sets of villages scored somewhat below the midpoint of the index. Literacy villages scored highest, with the control villages scoring slightly higher than the radio villages. All three sets of villages showed somewhat increased scores from 1964 to 1967 indicating a gradually rising level of aspirations. This increase in aspiration is taken as an indication that present views of cultivators are somewhat optimistic and that this in turn will contribute to a favorable attitude toward change and development programs. Family and children rank high in the hierarchy of values in India and the questions we asked focussed on educational and occupational aspirations which looked beyond the village. If these aspirations are to be achieved, of course, heavy investments must be made to provide schools and jobs.

Table 24: Average Score, Index of Educational and Occupational Aspirations, Communication Treatment and Control Villages Compared, 1964, 1966 and 1967†

Treatment	1964	1966	1967
Radio farm forum ...	1.43	1.85	1.96
Literacy classes	1.68	2.18	2.10
Control	1.58	2.14	2.01

† The aspiration index was constructed by using the following five equally weighted items, for a range of from 0 to 5:

(1) Education desired for son
Score: 0 to 8 years = 0; 9 years and above = 1

(2) Is it possible to educate your son (up to year indicated)
Score: No = 0; Yes = 1

(3) Occupation desired for first son
Score: Agriculture, fate, can't say = 0;
Other occupations = 1

(4) Occupation desired for second son
Score: Same as for (3) above

(5) Education desired for daughter
Score: 0 to 5 years = 0; 6 years and above = 1

Cutting-points for scoring were determined in 1964 and 1966 surveys but proved also to be appropriate for index construction in 1967.

Our conclusions in regard to these four measures of social change are that they indicate considerable progress in development programs and augur well for continued progress in the future. However, they do not importantly distinguish between the communication treatments or between the communication treatment villages and the control villages. When considered with the highly favorable attitudes toward programs of change discussed in the last section, the findings we obtained suggest that change agents who have well-conceived programs can expect reasonable co-operation

and success. Programs will have to be relevant to village conditions; promises of supplies and service must be kept up unless mitigating circumstances like flood or disaster are clearly evident; technical advice must be competent and timely. If these conditions are met, then, it would seem that progress can be made. There is some political knowledgeability among the villagers, especially the leaders. Villagers are reasonably secular in their orientations and have rising occupational and educational aspirations for their children. Social participation is low but is also rising. We interpret these findings favorably and urge continued efforts where possible which will result in higher village levels for these variables.

VILLAGER EVALUATION OF THE COMMUNICATION TREATMENTS

Our final section considers villager evaluation of the communication treatments. We wanted to determine if villagers could accurately recall the programs of radio farm forums and literacy classes. We also wanted to know, some year-and-a-half after the termination of the programs, whether villagers thought that the programs were useful and, if so, in what way.

Most respondents could accurately recall the programs (Table 25). Eighty-four per cent of the respondents in the radio villages gave a correct description of the programs as compared to 91 per cent who correctly recalled the literacy classes. The percentages of respondents who thought that the program was not useful were low and also quite similar. Eight per cent of respondents in the radio villages gave this response as compared to 12 per cent in the literacy villages.

Table 25: 'Were the Programs in 1964 Useful? If so, in what way?' Radio Farm Forum and Literacy Classes Compared, 1967

	Radio	Literacy
	*per cent**	
Not useful	8	12
Information about new agricultural practices	63	7
Market news, weather forecasts ...	17	0
Education, learn to read and write ...	12	81
	100	100
No answer or no recall (number)† ...	19	22

* Percentages are of the first specific response only. There were few multiple responses spanning the three categories of usefulness.

† Eighty-four per cent of the respondents in the radio villages gave a correct description of the programs as compared to 91 per cent who correctly recalled the literacy classes.

Responses as to how the programs were useful apparently followed closely the perceived principal focus of the programs. Most of the radio farm forums were devoted to broadcasts and discussions of agricultural practices and 63 per cent of the responses in the radio villages indicated that information about new practices was the chief usefulness. Only 7 per cent of cultivators in the literacy villages gave this response although the literacy classes reading materials also stressed new practices. Learning to read and write was one main focus of the literacy classes and there were 81 per cent in the literacy villages who reflected this by responding 'learn to read and write', 'get educated' or 'learn'. There were only 12 per cent in the radio villages who gave the general response of 'learn' without mention of specific information. Seventeen per cent of respondents in the radio villages mentioned market news or weather forecasts, while no respondents in the literacy villages did so.

These findings indicate a generally favorable response to the communication treatments and a reasonably lasting impression. They also indicate that the intent of the treatments, to disseminate information and to promote acceptance of improved practices, was much better served by the radio farm forums than by the literacy classes. This villager evaluation, of course, confirms what we have shown previously. The radio farm forums were more efficacious in practice promotion and in bringing about higher levels of various social change variables. As we pointed out earlier, they were also more efficient in that time, labor and money inputs were considerably less. We recognize that literacy training, even for adults, is a long-term investment. However, we have checked specific results of literacy training over time and they were not striking. Advantages in allocation of scarce resources would seem to be with the radio farm forums.

SUMMARY AND CONCLUSIONS

We have reported on a continuing study to determine the effects of two communication treatments upon adoption behavior and other measures of social change. We found that one of the communication treatments, radio farm forums, was considerably more effective than the other treatment, adult literacy classes. Both sets of communication treatment villages tended to show more change than control villages, in which only the usual community development programs were undertaken.

The study on which our report is based is a follow-up of part of a two-nation comparative study initiated in 1964 in India and Costa Rica. Our report deals only with Indian data. In 1964, a benchmark survey

was made of selected villages in India to establish the level of knowledge, trial and adoption of certain agricultural, health and family planning practices. Information was also obtained on variables often associated with adoption. Then, in 1965, an experiment was conducted in which the communication treatments of literacy classes and radio farm forums were applied to two pairs of villages but not to a third pair on which benchmark data were also obtained. In 1966, a re-survey was made of the same respondents to examine the initial effects of the treatments. In 1967, another re-survey was made, again of the same respondents, to examine the continuing effects. Attrition due to various factors resulted, in 1967, in a sample for the present study of 279 respondents. All were males who had cultivated some land during the time of the study and who had been interviewed in 1964, 1966 and 1967 whether or not they participated directly in the communication treatments. Data which we report were obtained by asking identical questions in all three years, so as to yield comparable results.

We were mainly interested in examining our data for possible individual and village changes of a continuing nature. Consequently, we have stressed similarities and differences as we found them in the three sets of villages in 1967. The villages varied somewhat in 1964 but were reasonably at the same level then on almost all of the variables which we investigated. In 1967, the radio farm forum treatment villages showed significantly more progress than the literacy and control villages. This was true whether measured by adoption of practices or by other variables. There was some tendency for the literacy villages to score higher than the control villages but usually these

differences were not statistically significant. In only two of the 1967 comparisons did the control villages score highest. We present these comparisons visually in the form of rankings (Tables 26 and 27), and discuss the variables briefly below.

Table 26: Ranking of Communication Treatment and Control Villages, Knowledge, Trial and Adoption Variables, 1967†

Variables	Radio farm forum villages	Literacy classes villages	Control (no treatment) villages
Average number of agricultural practices known	1	2	3
Average number of agricultural practices tried	1	2	3
Average number of agricultural practices adopted	1	2	3
Average number of health practices known	1	2	3
Average number of health practices tried	1	2	3
Average number of health practices adopted	1	2	3
Per cent who knew about family planning	3	1	2
Per cent who had adopted family planning	1	3	2
Average number of family planning methods known	1	3	2

† 'Ranking' here refers to the position of the three sets of villages in terms of averages or percentages. Thus in the first item, the radio farm forum villages had the highest average number of agricultural practices known, followed by literacy classes villages with the second highest and by control villages with the third highest. For actual figures and statistical comparisons consult the appropriate Table in the text.

Table 27: Ranking of Communication Treatment and Control Villages, Selected Variables of Social Change, 1967

Variables	Radio farm forum villages	Literacy classes villages	Control (no treatment) villages
Average score, index of change agents known	1	2	3
Average score, index of change agent contact	3	2	1
Average score, test of functional literacy	2	1	3
Average number of papers read	2	1	3
Per cent who listened to radio	1	3	2
Average number of films seen	2	3	1
Average score, index of attitudes toward programs of change	1	2	3
Average score, index of political knowledgeability	1	2	3
Average score, index of social participation	1	3	2
Average score, index of aspirations	3	1	2
Average score, index of orientation toward secularism	1	2	3

Knowledge of agricultural practices increased substantially in all three sets of villages from 1964 to 1967 but averages did not vary significantly in 1967. Trial and adoption of agricultural practices were at much lower levels than knowledge in 1967 but in these variables the radio farm forum villages had clearly higher averages. Averages for literacy villages were almost identical with those for control villages. These adoption figures are the most conclusive ones we have of the superiority of the radio farm forum treatments. These adoption figures also demonstrate that radio, in the form of radio farm forums, can be useful to convince potential adopters as well as to provide them with first information about new practices.[15] These adoption figures further indicate that specific long-term or 'sleeper' effects of literacy training are probably quite limited.

Knowledge, trial and adoption of health practices were at low levels. We concluded that the low level of knowledge probably reflected the very low level of trial and adoption of health practices and that one of the most important implications of our health data may be that of a lessened concern for family planning. Radio villages again showed the highest averages and we would like to repeat here that radio, in the form of radio farm forums, has utility for convincing potential adopters to take up new practices.

Knowledge of family planning increased markedly from 1964 to 1967. About 80 per cent of the respondents could mention at least one birth-control technique which they knew about. Differences in knowledge about family planning *per se* among the three sets of villages

15. Radio and other mass media have chiefly been seen as useful for first information about a practice. See E. M. Rogers, *Diffusion of Innovations*, New York: The Free Press of Glencoe, 1962, p. 99 and elsewhere.

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in 1967 were not significant but radio villages knew significantly about more methods of family planning than either the literacy or control villages. Respondents predominantly mentioned the methods of vasectomy and IUCD (Intra-Uterine Contraceptive Device). Few respondents practised family planning and differences among the villages are probably not reliable. Levels of adoption of family planning seem to be rising slowly.

In addition to knowledge, trial and adoption of improved practices, we examined eleven variables commonly associated with practice adoption to see if there were changes in them in 1967 which would help us to evaluate the communication treatments. The results generally showed averages and percentages of radio villages to be higher than those of the literacy and control villages. However, they were not as conclusively so as they were in the knowledge, trial and adoption data. Some of these variables are considerably more complex and are more difficult to measure.

Index scores for extension agent knowledge were significantly higher for radio villages than those for literacy and control villages. For extension agent contact, however, these positions were reversed. Control villages scored highest. We attributed this reversal of what had been a consistent trend in the direction of higher averages for the radio villages to greater proximity of control villages to block headquarters and to the effect of a very popular VLW living in one of the control villages.

Literacy villages scored highest on a seven-word test of functional literacy, but not significantly higher than the radio villages. Two-thirds of all respondents were functionally illiterate. We concluded that literacy classes not only do not make a very good vehicle for pro-

moting acceptance of innovations, but that they require a great deal of input for a payoff in increased literacy.

Mass media contact was measured by per cent who listened to radio, number of newspapers read last week, and number of times seen a commercial film last year. Radio villages showed the highest percentage of radio-listening but differences among the three sets of villages were not significant. Levels of newspaper reading were quite low and there were not significant differences among the three sets of villages. Three-fourths of all 279 respondents had not seen a commercial film in the previous year and thus differences among the sets of villages cannot be considered very valid.

There was widespread favorable response to three questions about encouragement or discouragement of programs of change, with radio villages again scoring highest. As actual adoption behavior was shown to lag far behind this near-universal social acceptance, we concluded that the chief result of such favorable opinions was to perhaps make the task of the change agent easier.

Radio villages scored highest on an index of political knowledgeability, testing awareness of state and national leaders, but differences were not significant. State leaders were less well-known than national leaders.

Radio villages scored significantly higher than literacy and control villages on an index of formal social participation but there were 101 respondents in all six villages combined who had no membership and held no office.

An index attempting to measure secularism also disclosed radio villages to have the highest scores but differences were not significant and there were only

slight increases in all three sets of villages from 1964 to 1967.

The final measure of social change which we presented was an index of educational and occupational aspirations for children. Literacy villages scored highest but differences were not significant.

It is apparent that in our study the communication treatment of radio farm forum was more effective than the treatment of literacy classes. Literacy villages tended to score higher than the control villages but the differences were often not significant.

In another time and place, with differently-run programs, different results may be obtained. As social experiments go, however, subject as they are to a multitude of intrusive and uncontrollable factors, this one is reasonably defensible. We believe that our results are as conclusive as one social experiment can be. We would advise increased use of radio farm forums where they can be organized so as to elicit villager participation. Forums should take up only highly relevant and technologically sound practices. Practices like the smokeless *chula* should be avoided. Whatever the merits or demerits of the smokeless *chula* may be, zero adoption in all three years in which we surveyed seems sufficient evidence to regard it as a questionable practice for promotional efforts.

Additionally, because we have shown substantial effects of more indirect measures of social change, radio farm forums should be integrated into an on-going program that will capitalize on initial social gains of the radio forums. It may not be possible for every village to attain its own individual, self-sustaining 'take-off', but wherever possible, an upward spiral should be encouraged. Our results indicate that

progress can be expected and that this predictability of success of a well-run radio forum should permit accelerated progress.

We do not, of course, condemn or slight literacy training programs. As we have stated, and the villagers themselves indicated, literacy programs have a high social value. Ultimately, any country that desires a high level of development must attain a similar level of literacy. For developing nations, however, resources are almost always scarce. Literacy programs, as our experience has shown, are expensive. Therefore, they should be considered either as a long-term investment in development or as social welfare. It may be that additional discussion could be incorporated into the literacy classes, or that the classes could be combined with another program, perhaps even with a radio forum. However, it is likely that the importance attached to learning to read and write will remain paramount with villagers and that it will be difficult to transfer their motivation from literacy to adoption of specific innovations.

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